

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 10 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, claim 10 recites the limitation "a switchable beam rotation device configured to controllably change a polarization angle at which a polarized radiation beam is incident on the optical element". However, the specification does not show that the switchable beam rotation device is part of the optical element. Instead, the switchable beam rotation device is an element by itself (see Fig. 4B, element 184). Therefore, the specification requires supports for an optical element having at least two adjacent materials and a switchable beam rotation device.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 3 and 4 each recites the limitation "said beam rotation means" in line 2 of each claims. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 4-11, 13, 14 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koike et al. (US 5,867,315; hereafter Koike) in view of Kitamura et al. (US 2003/0007446; hereafter Kitamura).

Regarding claims 1 and 4:

Koike discloses an optical scanning device (see col. 4, lines 18-20) for scanning an information layer of an optical record carrier, the device comprising a radiation source for generating a polarized radiation beam (see Fig. 2; beam 2) and an objective system for converging the radiation beam on the information layer (see Figs. 12A, 12B, 13A or 13B), wherein the device includes an optical element (see Fig. 2, element 10) comprising at least two adjacent materials with a shaped interface between the materials (see Fig. 2, reference number 9 indicates the shaped interface), at least the first of the materials being birefringent (see col. 5, lines 54-63), the second material having a refractive index substantially equal to the refractive index of the birefringent material at a predetermined angle (see Fig. 13A; both materials have refractive index of n_0).

Although Koike discloses a beam rotation means arranged to alter a polarization angle at which the polarized radiation beam is incident on the optical element; however, Koike fails to show whether the beam rotation means is a switchable beam rotation means.

On the other hand, Kitamura discloses an optical scanning device for scanning an information layer of an optical record carrier, the device comprising: a switchable beam rotation means arranged to controllably alter a polarization angle at which the polarized radiation beam is incident on an optical element (see Figs. 1A-1B; element 33).

At the time the invention was, it would have been obvious to a person of ordinary skill in the art to modify the optical scanning device of Koike to include a switchable beam rotation mean as suggested by Kitamura. One of ordinary skill in the art would have been motivated to do this because switchable beam rotation means allows for compatibility between a high-density optical disk and a standard-density optical disk.

Regarding claim 5:

Koike discloses the device as claimed in claim 1, wherein said second material is birefringent (see col. 8, lines 60-65).

Regarding claim 6:

Koike discloses the device as claimed in claim 1, wherein the second material has a refractive index n_s and the birefringent material has an ordinary refractive index n_o and an extraordinary refractive index n_e , wherein $n_e \geq n_s \geq n_o$ or $n_e \leq n_s \leq n_o$ (see Fig. 5 or 6; n_g corresponds to n_s).

Regarding claim 7:

Koike discloses the device as claimed in claim 1, wherein at least one of the first material and the second material is shaped as a lens (see any of the Figs. 3-14).

Regarding claim 8:

Koike discloses the device as claimed in claim 1, wherein at least of said first material and said second material is shaped as at least one of a planoconcave lens and a planoconvex lens (see Fig. 4 for example; element 11 is a planoconvex lens and element 12 is a planoconcave lens).

Regarding claim 9:

Koike discloses the device as claimed in claim 1, wherein one of the two materials is shaped as a planoconvex lens and the other of the two materials is shaped as a mating planoconcave lens (see Fig. 4 for example; element 11 is a planoconvex lens and element 12 is a planoconcave lens).

Regarding claim 10:

Koike discloses an optical component (see Fig. 13A, element 10) comprising at least two adjacent materials with a curved interface between the materials, at least the first of the materials being birefringent (see col. 5, lines 54-63), the second material having a refractive index substantially equal to the refractive index of the birefringent material at a predetermined angle (see Fig. 13A, refractive index of both material is no).

Although Koike discloses a beam rotation means arranged to alter a polarization angle at which the polarized radiation beam is incident on the optical element (see Fig. 6; incident beam 2 is being rotated 45 degree); however, Koike fails to show whether the beam rotation means is a switchable beam rotation means.

On the other hand, Kitamura discloses a switchable beam rotation means arranged to controllably alter a polarization angle at which the polarized radiation beam is incident on an optical element (see Figs. 1A-1B; element 33).

At the time the invention was, it would have been obvious to a person of ordinary skill in the art to modify the optical scanning device of Koike to include a switchable beam rotation mean as suggested by Kitamura. One of ordinary skill in the art would have been motivated to do this because switchable beam rotation means allows for compatibility between a high-density optical disk and a standard-density optical disk.

Regarding claim 11:

Koike discloses the optical element as claimed in claim 10, wherein said interface is curved (see Fig. 13A, element 10).

Regarding claim 13:

Koike discloses the optical component as claimed in claim 10, wherein at least one of the outer surfaces of the optical element is planar (see Fig. 13A, element 10).

Regarding claim 14:

Claim 14 recites similar limitations as in claim 1; therefore, Koike and Kitamura disclose all the features in claim 14.

Regarding claim 17:

Koike does not, but Kitamura discloses the device, wherein the switchable beam rotation means arranged to controllably alter the polarization angle by 90 degrees in a first state, and not alter the polarization angle in a second state (see par. [0059]-[0060]; first state corresponds to a state when the switch 39 is off, and second state corresponds to a state when the switch 39 is turn on).

Regarding claim 18:

Koike does not, but Kitamura discloses the device, wherein the switchable beam rotation means comprises a twisted nematic cell, the first state being an off state of the twisted nematic cell, and the second state being an on state of the twisted nematic cell (see par. [0058]-[0060]).

Regarding claims 19 and 20:

Claims 19 and 20 recite similar limitations as in claims 17 and 18; hence, claims 19 and 20 are rejected under the same reasons set forth in claims 17 and 18.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koike in view of Kitamura as applied to claim 1 above, and further in view of Bun (JP11-003528).

Koike and Kitamura disclose all the features in claim 1; however, Koike and Kitamura fail to disclose that the beam rotating means is arranged to rotate the optical element. On the other hand, Bun discloses an optical scanning device having a beam rotating means arranged to rotate an optical element (see Figs. 4-5; element 18 is being rotated).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the device of Koike to rotate the optical element as suggested by Bun. One of ordinary skill in the art would have been motivated to do this because such modification reduces the overall weight of the device by eliminating the need to have another optical element that serves to alter the angle of the incident beam.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koike in view of Kitamura as applied to claim 10 above, and further in view of Tanabe et al. (US 6,304,312; hereafter Tanabe).

Regarding claim 12:

Koike and Kitamura disclose all the features in claim 10; however, Koike and Kitamura fail to disclose that the first material comprises a polymerized anisotropically oriented liquid crystal. On the other hand, Tanabe discloses an optical component comprises a polymerized anisotropically oriented liquid crystal (see col. 2, lines 1-4).

At time the invention was made, it would have been obvious to a person of ordinary skill in the art to utilize a polymerized anisotropically oriented liquid crystal as the first material in the optical component of Koike. One of ordinary skill in the art would have been motivated to do this because the optically anisotropic polymer liquid crystal can have an alignment direction periodically changed to form a grating of different indices, obtaining a high-utilization efficiency by light ray and a high degree of reliability (see Abstract).

Response to Arguments

10. Applicant's arguments with respect to claims 1, 10 and 14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lixi Chow whose telephone number is 571-272-7571. The examiner can normally be reached on Mon-Fri, 8:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571-272-7582. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lixi Chow/
10.23.08

/Wayne Young/
Supervisory Patent Examiner, Art Unit 2627